

## *Cost/Benefit Analysis for the Cold Waste Handling System (Cuber)*

*By*

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### **History**

In FY 97, the Idaho National Engineering and Environmental Laboratory (INEEL) received a grant from The Department of Energy Pollution Prevention group to build a facility to convert waste material into a process engineered fuel (PEF). The PEF would be made from routine office trash, unclassified sensitive documents and wood chips. This fuel (cubes) was to be burned in the INTEC Coal Fired Steam Generating Facility (CFSGF) to replace coal. The equipment had been used extensively in the agricultural industry to process hay into cubes to reduce storage volume and minimize transportation costs.

This equipment is now utilized at the INEEL to convert material previously buried at the Central Facilities Landfill and the Bonneville County Landfill into cubes that displace coal used to generate steam. The coal and cubes are mixed then fed into the CFSGF which burns the mixture to produce process and heating steam for the Idaho Nuclear Technology and Engineering Center (INTEC).

The cubing system is not integrally tied to the CFSGF. Several facilities have expressed interest in the cubes for waste-to-energy uses. The school district in Idaho Falls and Ricks college have both expressed an interest in using the cubes at their facilities. Other entities such as the tribes at Fort Hall may also be interested in utilization of the cubed waste. The cost of displaced coal is small when compared to other cost savings.

The disposal of industrial waste has always been accomplished by utilizing land disposal methods. All Department of Energy facilities have been strongly encouraged to seek alternate disposal/reuse methods for wastes generated.

### **Cost/Benefit Analysis**

Several costs have been saved with the operation of the cold waste handling facility and the cuber system.

1. By bringing the town waste to the INEEL the cost of waste removal by the city of Idaho Falls was eliminated with a savings of \$ 94,000/year. The cost to bring the town waste to the INEEL landfill is a few labor hours per week and fuel for the trucks. Innovative truck movement by sending the truck to town the previous night has resulted in the cost being held to a minimum. Changes made to the methodology for picking up site waste has made the amount of equipment operator time stay the same as before the waste was moved from town.
2. The paper recycling contract required segregation of paper that was picked up by the janitorial staff at a cost of \$ 40,000/year. If paper recycling was to be restarted at the INEEL, paper prices are so low it is believed that any paper recycling contractor would actually charge to recycle paper since our disposal requirements are stricter than the general public.

3. Disposal of sensitive unclassified material (SUI) previously required the documents to be shredded or buried while security witnessed the disposal. Security has estimated generation of SUI material to be 60 boxes/week. Security estimated the time saved by employees at shredders and the security forces who witnessed the burial to be \$ 150,000/year.
4. Closure of three of the old landfill sites utilized for the past 30+ years at the INEEL was completed just a few years ago. The cost for this closure (capping) was \$ 1.2M. Additionally, nine monitoring wells were drilled and are periodically sampled to monitor for environmental pollutants. The cost of the wells plus monitoring activities for ten years is estimated at \$550,000. Using landfill maps it was determined that about 40 acres of landfill were covered. This results in a life cycle cost of about \$ 45,000/acre to manage industrial waste and close old fill sites. It has been calculated utilizing actual production numbers that the cuber system displaces about 30,000 cubic yards per year which saves roughly 2 acres of landfill space per year. This equates to a savings of \$ 90,000/ year in industrial waste life cycle costs.
5. About 200 tons of coal are displaced per year at the CFSGF with cubes. Coal costs about \$50/ton which results in a savings of about \$ 10,000/year. Even if the cubes were to be given away to schools/tribes the cost impact would be small. Certainly nothing dictates incineration of the cubes at the CFSGF.
6. Labor and materials for operation of the cubing system have been running about \$ 300,000/year. Coupled with the many benefits listed below the cuber is extremely beneficial to both the DOE and the INEEL.

### **Other Items for Consideration**

Several other items need to be considered that do not have direct cost savings or impacts but are very important to consider. Some items are public relations considerations while others demonstrate good environmental stewardship. Those items are listed below.

1. Pollution prevention efforts are required in our Part B permit under RCRA.
2. DOE-HQ (EM-77) established goals for the reduction of sanitary waste generation for the INEEL in Executive Order 12856. DOE-ID and LMITCO have also established a number of environmental goals to move the INEEL towards environmental excellence. Performance of the cold waste handling system and the cuber are closely tied to meeting the sanitary waste portion of these goals. Performance indicators for the cubing system are reported quarterly to DOE-HQ. This performance is tied to several CPAF items.
3. The cuber is considered a very positive waste handling feature at the INEEL by the general public. The Citizens Advisory Board has toured the cold waste handling facility and cuber several times and is highly complementary. Additionally, there have been several DOE-HQ tours as well as tours almost weekly by the general public and LMITCO employees. Several magazine articles have been written that feature the cubing system. Interest in the equipment and facility comes from around the world. Several presentations have been made at conferences and interest is always high.

4. Several CRADA's have been worked with the cuber. The last one was with a material called bio-lime that was incorporated into the cubes and testing was completed at the CFSGF with controlled burns. The bio-lime performed so well and had such good results, the technical personnel at the Waste Experimental Reduction Facility's are considering burning some cubes in their incinerator to help reduce gaseous emissions. Other CRADA's are being explored with several parties being interested.
5. The EM-70 director was at the INEEL and is very interested in the cubing system. He is trying to identify money that will make the throughput of the cuber even higher. The shredding system is currently the slow point of the system and a new shredder is being evaluated for both performance and cost.
6. Security is attempting to make the INEEL the disposal site for SUI material complex-wide. This could result in many tons/month of paper material per month.
7. Excess/damaged wood that cannot be recycled is currently processed through a chipper at the landfill. The chips are currently being stockpiled and plans are to ultimately fold this material into the feed stream for the cubing system. This will increase the BTU content of the cubes and make them more desirable as a feedstock into boilers.